BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-043731
(43)Date of publication of application : 16.02.1999

(51)Int.Cl. C22C 9/06

(21)Application number : 09-214149
(22)Date of filing : 23.07.1997

(71)Applicant : KOBE STEEL LTD
(72)Inventor : OGURA TETSUZO
HOSOKAWA ISAO
HAMAMOTO TAKASHI
MIWA YOSUKE
ISONO MASAAKI

(54) HIGH STRENGTH COPPER ALLOY EXCELLENT IN STAMPING PROPERTY AND SUITABLE FOR SILVER PLATING

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a Gu-Ni-Si type high strength copper alloy excellent in silver plating suitableness as well as in stamping property.
SOLUTION: This high strength copper alloy has a composition which consists of, by weight, 0.4-4.0% Ni, 0.05-1.0% Si, 0.001-5% Sn, 0.1-5.0% Zn, 0.005-1.0% Mg, 0.0003-0.005% S, 0.0003-0.01% C, and the balance Cu with inevitable impurities and in which respective contents of Mg and S simultaneously satisfy the following (1) and (2): (1) $-0.5[Mg]+0.005 \leq [S]$; (2) $[S] \leq 0.25[Mg]$. In the above inequalities, [Mg] and [S] represent respective weight percentages of Mg and S.

LEGAL STATUS

[Date of request for examination] 25.02.2002

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

[Claim(s)]
[Claim 1] nickel: 0.4 - 4.0wt% and Si:0.05 - 1.0wt% and Sn:0.001 - 5.0wt%, Zn: 0.1 - 5.0wt% and Mg:0.005 - 1.0wt%, and S:0.0003 - 0.005wt %, The Koriki copper alloy which is excellent in the stamping processability and silver plating nature which are characterized by containing C:0.0003 - 0.01wt%, consisting of the remainder Cu and an unescapable impurity, and the content of Mg and S filling the following formula (1) and (2) simultaneously further.
0.5[Mg]+[S] >=0.005 .... (1)
0.25 [Mg] >= [S] .... (2)
(It is the same the following as which [Mg] means wt% of Mg and [S] means wt% of S)
[Claim 2] The Koriki copper alloy which is excellent in the stamping processability and silver plating nature which are characterized by the following. nickel: 0.4 - 4.0wt% and Si:0.05 - 1.0wt% and Sn:0.001 - 5.0wt% and Zn:0.1 - 5.0wt% and Mg:0.005 - 1.0wt%, and S:0.0003 - 0.005wt %, and C:0.0003 - 0.01wt %. While it consists of the remainder Cu and an unescapable impurity and the content of Mg and S fills the following formula (1) and (2) simultaneously further, the diameter of average crystal grain of the direction of board thickness is 20 micrometers or less.
0.5[Mg]+[S] >=0.005 .... (1)
0.25 [Mg] >= [S] .... (2)
[Claim 3] nickel: 0.4 - 4.0wt% and Si:0.05 - 1.0wt% and Sn:0.001 - 5.0wt%, Zn: 0.1 - 5.0wt% and Mg:0.005 - 1.0wt%, and S:0.0003 - 0.005wt %, C:0.0003 - 0.01wt% is contained. as an accessory constituent Be, B, aluminum, P, Ti, V, Cr, Mn, Fe, Co, Pb, calcium, Zr, It contains. the inside of Nb, Mo, Ag, In, Sb, Hf, and Ta -- one sort or two sorts or more -- a total amount -- 0.001 - 1.0wt% -- The Koriki copper alloy which is excellent in the stamping processability and silver plating nature which are characterized by consisting of the remainder Cu and an unescapable impurity, and Mg and S filling the following formula (1) and (2) simultaneously further.
0.5[Mg]+[S] >=0.005 .... (1)
0.25 [Mg] >= [S] .... (2)
[Claim 4] The Koriki copper alloy which is excellent in the stamping processability and silver plating nature which are characterized by the following. nickel: 0.4 - 4.0wt% and Si:0.05 - 1.0wt% and Sn:0.001 - 5.0wt% and Zn:0.1 - 5.0wt% and Mg:0.005 - 1.0wt%, and S:0.0003 - 0.005wt %, and C:0.0003 - 0.01wt %. As an accessory constituent, Be, B, aluminum, P, Ti, V, Cr, Mn, Fe, Co, It contains. the inside of Pb, calcium, Zr, Nb, Mo, Ag, In, Sb, Hf, and Ta -- one sort or two sorts or more -- a total amount -- 0.001 - 1.0wt% -- While it consists of the remainder Cu and an unescapable impurity and Mg and S fill the following formula (1) and (2) simultaneously further, the diameter of average crystal grain of the direction of board thickness is 20 micrometers or less.
0.5[Mg]+[S] >=0.005 .... (1)
0.25 [Mg] >= [S] .... (2)

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the Koriki copper alloy which is excellent in the stamping processability and silver plating nature which are used for the electrical and electric equipment and electronic parts, such as a semiconductor leadframe, a terminal, a connector, a relay, and a switch.
[0002]
[Description of the Prior Art] Since an Cu-nickel-Si system copper alloy combines intensity and conductivity, it is widely used for the electrical and electric equipment and electronic parts, such as a semiconductor leadframe, a terminal, and a connector. In recent years, reduction of the lead interval of a leadframe or reduction of the pitch between poles of a connector is achieved with the miniaturization of the electrical and electric equipment and electronic parts, lightweight-izing, and high integration. thereby -- the demand of high-intensity-izing and a raise in conductivity -- from the first -- stamping processability (there are little the burr after stamping processing, who, etc.) -- excelling -- a stamping -- the demand of material which does not wear metal mold is growing (for example, refer to JP,2-66130,A) Moreover, although silver plating of these electrical and electric equipment and the electronic parts may be carried out, also compared with the former, importance is attached increasingly (for example, refer to JP,63-130739,A, JP,5-59468,A, and JP,8-319528,A) to silver plating nature by improvement demand increase of reliability.
[0003]
[Problem(s) to be Solved by the Invention] In the electrical and electric equipment and the Cu-nickel-Si system copper alloy for electronic parts, Mg is used as an alloying element which suppresses decline in conductivity and aims at improvement in intensity. And although an effect is large also to reduction of stamping processability and golden wearing of die as Mg is indicated by above-mentioned JP,2-66130,A, on the other hand, it is known that a minute amount will also degrade silver plating nature (the salient of silver plating is generated). It aims at reconciling the property considered to conflict conventionally called stamping processability and silver plating nature in the Cu-nickel-Si system Koriki copper alloy in which this invention contains Mg.
[0004]
[Means for Solving the Problem] The Koriki copper alloy which is excellent in the stamping processability and silver plating nature concerning this invention nickel: 0.4 - 4.0wt% and Si:0.05 - 1.0wt% and Sn:0.001 - 5.0wt%, Zn: 0.1 - 5.0wt% and Mg:0.005 - 1.0wt%, and S:0.0003 - 0.005wt %, C:0.0003 - 0.01wt% is contained, and it consists of the remainder Cu and an unescapable impurity, and is characterized by the content of Mg and S filling the following formula (1) and (2) simultaneously further.
0.5[Mg]+[S] >=0.005 .... (1)
0.25 [Mg] >= [S] .... (2)
[0005] the above-mentioned copper alloy -- as an accessory constituent -- the inside of Be, B, aluminum, P, Ti, V, Cr, Mn, Fe, Co, Pb, calcium, Zr, Nb, Mo, Ag, In, Sb, Hf, and Ta -- one sort or two sorts or more -- a total amount -- 0.001 - 1.0wt% -- it can contain Moreover, it is desirable that the diameter of average crystal grain of the direction of board thickness is 20 micrometers or less.
[0006]
[Embodiments of the Invention] Hereafter, the component of the copper alloy concerning this invention and the reason for limitation of the diameter of crystal grain are explained.
(nickel) By adding with Si, nickel is an element which has the operation which generates the compound of nickel and Si and raises the intensity of an alloy. However, since hot-working nature and cold-working nature will deteriorate if this effect is small and contains exceeding 4.0wt%, it is not desirable less than [0.4wt%]. Therefore, the content of nickel may be 0.4 - 4.0wt%.
[0007] (Si) By adding with nickel, Si is an element which has the operation which generates the compound of nickel and Si and raises the intensity of an alloy. However, if this effect is small and contains exceeding 1.0wt(s)%, since hot-working nature and cold-working nature will deteriorate, it is not desirable less than [0.05wt%]. Therefore, the content of Si may be 0.05 - 1.0wt%.
[0008] (Sn) Sn is an element which raises intensity, a spring property, and a stress relaxation characteristic-proof. However, this effect is small, and since it causes degradation of hot-working nature, and decline in conductivity while an effect is saturated, even if contained exceeding 5.0wt%, it is not desirable less than [0.001wt%].
[0009] (Zn) Zn is an element which raises the heat-resistant detachability of tin and tin-alloy plating, and also raises migration-proof nature further. However, these effects are small, and since they cause decline in conductivity, and increase of stress corrosion crack sensitivity-proof while an effect is saturated, even if contained exceeding 5.0wt%, they are not desirable less than [0.1wt%]. Therefore, the content of Zn may be 0.1 - 5.0wt%.
[0010] (Mg) Mg is an element which has an effect also in reduction of golden wearing of die while raising intensity, a stress relaxation characteristic-proof, and stamping processability. 0. The effect is small, and since it causes degradation of fluidity and hot-working nature, and decline in conductivity while the effect is saturated, even if contained exceeding 1.0wt%, it is not desirable less than [005wt%]. Therefore, the content of Mg may be 0.005 - 1.0wt%. Furthermore, Mg participates also in silver plating nature by the interaction with S as it is described below.
[0011] (S) While S raises stamping processability with Mg, it is also the element which is easy to make it generate the silver salient at the time of silver plating. 0. Less than [0003wt%], if the effect of raising stamping processability is small and contains

exceeding 0.005wt%, silver plating nature and hot-working nature will be degraded. Therefore, the content of S may be 0.0003 - 0.005wt%.
[0012] (Relation between Mg and S) In the Cu-nickel-Si system Koriki copper alloy containing Mg, in order to reconcile stamping processability and silver plating nature, this invention persons found out that it was necessary to limit both components to the following ranges. First, more ones of Mg and S from the field of stamping processability are desirable, and it is required to fill the following formula (1) at worst.
0.5[Mg]+[S] >=0.005 .... (1)
[0013] Next, it is required to control the ratio by the following views from the field of silver plating nature. That is, the cause of main of a silver salient is MgS which Mg and S combined and generated, and when it localizes in a copper alloy, it is for the local potential of the portion to become low and for a local deposit of silver to take place. However, if there are fully many contents of Mg, since Mg which dissolves in copper will make small the potential difference between the matrix of a copper alloy, and MgS, a local deposit of silver stops being able to happen easily. Therefore, more ones of Mg are desirable by the ratio with S, and it is required to fill the following formula (2) at worst.
0.25 [Mg] >= [S] .... (2)
[0014] (C) This invention persons found out that C had the operation which raises the stamping processability of the Cu-nickel-Si system copper alloy containing Mg. However, if the effect is small and being contained exceeding 0.01wt%, while the effect will be saturated with less than [0.0003wt%], hot-working nature is degraded. therefore, the content of C -- 0.0003 - 0.01wt% -- you may be 0.001 - 0.01wt% preferably
[0015] (Accessory constituent) The accessory constituent of Be, B, aluminum, P, Ti, V, Cr, Mn, Fe, Co, Pb, calcium, Zr, Nb, Mo, Ag, In, Sb, Hf, and Ta is the purpose which raises intensity and stamping processability further, and is the element which can be added in the range allowed decline in conductivity. If one sort or two sorts or more of total amounts of these elements have the small improvement effect in on the strength less than [0.001wt%] and contain exceeding 1wt%, decline in conductivity becomes remarkable and is not desirable. Therefore, the total amount of these accessory constituents is made into 0.001 - 1wt%.
[0016] (Diameter of crystal grain) In the Cu-nickel-Si system copper alloy containing Mg, this invention persons found out that the diameter of crystal grain of the direction of board thickness participated in stamping processability especially. Stamping processability can be raised if the diameter of average crystal grain of the direction of board thickness in the last board product state is 20 micrometers or less. It is 15 micrometers or less desirably. It is contained in this when crystal grain becomes flat by subsequent cold working though it is the diameter of crystal grain which exceeds 20 micrometers in a recrystallization stage, and the diameter of average crystal grain of the direction of board thickness is set to 20 micrometers or less. In addition, in the so-called fiber organization accepted in the material which performed a total of 90% or more of cold working after recrystallization, although crystal grain is difficult to observe, such a fiber organization is also included in this invention.
[0017]
[Example] The example of the Koriki copper alloy which is excellent in the stamping processability and silver plating nature concerning this invention is explained below with the example of comparison. The air dissolution was carried out under charcoal covering in the kryptol furnace, the copper alloy of the component composition shown in Tables 1-4 was cast to the book mold, and the 50mmx80mmx200mm ingot was produced. This ingot was heated at 930 degrees C, and after hot rolling, water quenching was carried out immediately and it considered as hot-rolling material with a thickness of 15mm. In order to remove the scale of the front face of this hot-rolling material, the front face was cut by the grinder. This hot-rolling material was made into 0.36mm in thickness with cold rolling, and water quenching was carried out after heat-treating for 20 seconds at 650-850 degrees C. Furthermore, it cold-rolled to 0.25mm in thickness, annealing of 2 hours was given at 450-500 degrees C, and the examination after removal was presented with the surface oxide film in pickling.
[0018]
[Table 1]

表-1

	No.	主成分（wt%） Cu	Ni	Si	Sn	Zn	Mg	S	C	副成分 (wt%)
実施例	1	残部	0.9	0.2	0.5	1.0	0.10	0.0015	0.0030	—
	2	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	—
	3	残部	3.2	0.7	0.5	1.0	0.10	0.0015	0.0030	—
	4	残部	1.8	0.4	0.01	1.0	0.10	0.0015	0.0030	—
	5	残部	1.8	0.4	0.1	1.0	0.10	0.0015	0.0030	—
	6	残部	1.8	0.4	3.0	1.0	0.10	0.0015	0.0030	—
	7	残部	1.8	0.4	0.5	0.3	0.10	0.0015	0.0030	—
	8	残部	1.8	0.4	0.5	3.0	0.10	0.0015	0.0030	—
	9	残部	1.8	0.4	0.5	1.0	0.01	0.0015	0.0030	—
	10	残部	1.8	0.4	0.5	1.0	0.30	0.0015	0.0030	—
	11	残部	1.8	0.4	0.5	1.0	0.70	0.0015	0.0030	—
	12	残部	1.8	0.4	0.5	1.0	0.10	0.0005	0.0030	—
	13	残部	1.8	0.4	0.5	1.0	0.10	0.0040	0.0030	—
	14	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0015	—
	15	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0080	—

[0019]
[Table 2]

表-2

	No.	主成分（wt%） Cu	Ni	Si	Sn	Zn	Mg	S	C	副成分 (wt%)
実施例	16	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Be : 0.1 B : 0.04 Al : 0.008
	17	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	P : 0.03 Ti : 0.02 V : 0.006
	18	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Cr : 0.005 Mn : 0.04 Fe : 0.02
	19	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Co : 0.03 Zr : 0.02 Nb : 0.01
	20	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Mo : 0.005 Ag : 0.03 In : 0.08
	21	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Sb : 0.07 Hf : 0.009 Ta : 0.01
	22	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Pb : 0.02 Ca : 0.005

[0020]
[Table 3]

表-3

	No.	主成分（wt%） Cu	Ni	Si	Sn	Zn	Mg	S	C	副成分 (wt%)
比較例	23	残部	0.3	0.4	0.5	1.0	0.10	0.0015	0.0030	—
	24	残部	4.5	0.4	0.5	1.0	0.10	0.0015	0.0030	—
	25	残部	5.0	1.1	0.5	1.0	0.10	0.0015	0.0030	—
	26	残部	1.8	0.4	0.0005	1.0	0.10	0.0015	0.0030	—
	27	残部	1.8	0.4	6.0	1.0	0.10	0.0015	0.0030	—
	28	残部	1.8	0.4	0.5	0.05	0.10	0.0015	0.0030	—
	29	残部	1.8	0.4	0.5	6.0	0.10	0.0015	0.0030	—
	30	残部	1.8	0.4	0.5	1.0	0.003	0.0015	0.0030	—
	31	残部	1.8	0.4	0.5	1.0	1.2	0.0015	0.0030	—
	32	残部	1.8	0.4	0.5	1.0	0.10	0.0002	0.0030	—
	33	残部	1.8	0.4	0.5	1.0	0.10	0.006	0.0030	—
	34	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0001	—
	35	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0120	—

アンダーラインの箇所は本発明の範囲外

[0021]
[Table 4]

表-4

	No.	主成分（wt%） Cu	Ni	Si	Sn	Zn	Mg	S	C	副成分 (wt%)
比較例	36	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Be : 0.1 * B : 0.04 Al : 1.2
	37	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	P : 0.6 * Ti : 0.5 V : 0.006
	38	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Cr : 0.5 * Mn : 0.04 Fe : 0.7
	39	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Co : 1.3 * Zr : 0.02 Nb : 0.01
	40	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Mo : 0.005 Ag : 0.03 In : 1.2 *
	41	残部	1.8	0.4	0.5	1.0	0.10	0.0015	0.0030	Sb : 1.1 * Hf : 0.009 Ta : 0.01
	42	残部	1.8	0.4	0.5	1.0	0.015	0.004	0.0030	—
	43	残部	1.8	0.4	0.5	1.0	0.006	0.0015	0.0030	—

アンダーラインの箇所又は*印の箇所は本発明の範囲外

[0022] About this test specimen, tensile strength, conductivity, the diameter of crystal grain, stamping processability, silver plating nature, and solder heatproof detachability were investigated in the following way. These results are shown in Table 5 and 6. The JIS No. 5 test piece was used for tensile strength. Conductivity was measured by the double bridge method. The

diameter of crystal grain was measured in the direction of board thickness by the intercept method of the copper elongation article grain-size-number test method specified to JISH0501. Evaluation of stamping processability pierced the lead with a length [of 30mm], and a width of face of 0.5mm with a press, and measured the height of a burr. Silver plating nature observed the existence of the phenomenon (salient) in which plating thickness becomes thick locally, with the stereoscopic microscope, when cyanogen system silver plating was performed 1 micrometer in thickness. After solder heatproof detachability bent 180 degrees of material which was immersed in the 245-degree C solder bath (60Sn/40Pb) for 5 seconds, and covered about 20-micrometer plating layer and returned them monotonously after 1000-hour heating at 150 degrees C, it observed the existence of ablation of a solder plating layer.

[0023]

[Table 5]

表-5

	No.	熱間加工性	引張強さ (N/mm^2)	導電率 (%IACS)	平均結晶粒径 (μm)	ばり高さ (μm)	銀突起有無	はんだ剥離 有無
実施例	1	良好	580	45	7.5	8	無し	無し
	2	良好	730	43	7.5	5	無し	無し
	3	良好	900	40	7.5	3	無し	無し
	4	良好	710	48	7.5	5	無し	無し
	5	良好	720	47	7.5	5	無し	無し
	6	良好	770	30	7.5	5	無し	無し
	7	良好	720	44	7.5	5	無し	無し
	8	良好	740	42	7.5	5	無し	無し
	9	良好	710	44	7.5	7	無し	無し
	10	良好	750	41	7.5	4	無し	無し
	11	良好	780	38	7.5	3	無し	無し
	12	良好	730	43	7.5	7	無し	無し
	13	良好	730	43	7.5	3	無し	無し
	14	良好	730	43	7.5	7	無し	無し
	15	良好	730	43	7.5	3	無し	無し
	16	良好	800	37	7.5	3	無し	無し
	17	良好	770	38	7.5	3	無し	無し
	18	良好	740	42	7.5	4	無し	無し
	19	良好	750	42	7.5	4	無し	無し
	20	良好	760	41	7.5	3	無し	無し
	21	良好	750	41	7.5	3	無し	無し
	22	良好	750	41	7.5	2	無し	無し

[0024]

[Table 6]

表-6

	No.	熱間加工性	引張強さ (N/mm²)	導電率 (%IACS)	平均結晶粒径(μm)	ばり高さ (μm)	銀突起有無	はんだ剥離 有無
比較例	23	良好	530	36	7.5	10	無し	無し
	24	割れ	—	—	—	—	—	—
	25	割れ	—	—	—	—	—	—
	26	良好	700	43	7.5	5	無し	無し
	27	割れ	—	—	—	—	—	—
	28	良好	730	45	7.5	5	無し	有り
	29	良好	740	34	7.5	5	無し	無し
	30	良好	690	44	7.5	16	無し	無し
	31	割れ	—	—	—	—	—	—
	32	良好	780	38	7.5	15	無し	無し
	33	割れ	—	—	—	—	—	—
	34	良好	730	43	7.5	17	無し	無し
	35	割れ	—	—	—	—	—	—
	36	良好	890	24	7.5	3	無し	無し
	37	良好	960	9	7.5	3	無し	無し
	38	良好	770	31	7.5	3	無し	無し
	39	良好	760	29	7.5	3	無し	無し
	40	良好	790	30	7.5	3	無し	無し
	41	良好	800	28	7.5	3	無し	無し
	42	良好	710	43	7.5	5	有り	無し
	43	良好	700	44	7.5	13	無し	無し

ｱﾝﾀﾞｰﾗｲﾝの箇所は特性が劣る

[0025] As shown in Table 5, any property of this invention alloy No.1-22 is good. On the other hand, as shown in Table 6, since some components separate from the range specified to this invention, one of properties is inferior in comparison alloy No.23-43. In addition, by reaching No.42, although the content of Mg and S is contained in the convention range of this invention, since 43 separates from the range of a formula (1) or a formula (2), it is inferior in silver plating nature or stamping processability.
[0026] moreover, about the alloy of No.2 of Table 1, in order to see the influence of the diameter of crystal grain, the temperature of middle heat treatment for 20 seconds was changed (others -- a thermomechanical-treatment process etc. is the same as example No.2 of Table 5), and the same examination as the above was presented The result is shown in Table 7. Although No.2-2 to which the temperature of heat treatment for 20 seconds is low, and recrystallization did not happen became a fiber organization and the property almost equivalent to No.2 was acquired as shown in Table 7, No.2-3 whose temperature of heat treatment was high have a large diameter of average crystal grain, and stamping processability is low from No.2.
[0027]
[Table 7]

表-7

No.	熱間加工性	引張強さ (N/mm²)	導電率 (%IACS)	平均結晶粒径(μm)	ばり高さ (μm)	銀突起有無	はんだ剥離 有無
2	良好	730	43	7.5	5	無し	無し
2-2	良好	710	43	ﾌｧｲﾊﾞｰ状	4	無し	無し
2-3	良好	740	42	25	12	無し	無し

[0028]
[Effect of the Invention] If the copper alloy of this invention is pulled the degree of size energy since burr height is small when stamping processing of the electrical and electric equipment and the electronic parts, such as a leadframe of a semiconductor device, and a terminal, a connector, is carried out, for example while satisfying the properties of the intensity demanded as the

electrical and electric equipment and an object for electronic parts, conductivity, and solder, such as heat-resistant detachability, it can raise a blanking golden service life of die remarkably. Moreover, generating of the silver salient when carrying out silver plating can be suppressed. Therefore, contribution of as opposed to the productivity of the electrical and electric equipment and electronic parts and the improvement in reliability in this invention is size.

[Translation done.]